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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:		Marco Potke
Serial No.	:	10/598,448
Filed	:	May 9, 2007
For	:	DETERMINING AND USING GEOMETRIC FEATURE DATA
Group No.	:	2624
Examiner	:	Mia M. Thomas
Conf. No.	:	5356

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellant herewith respectfully submits that the Examiner's decision of November 18, 2010, finally rejecting Claims 1-3, 5, 14 and 15 in the present application, should be reversed, in view of the following arguments and authorities. This Brief is submitted subsequent to the Notice of Appeal filed February 11, 2011. The $540.00 Appeal Brief filing fee is submitted herewith, and the Commissioner is authorized to charge any additional necessary fees to Deposit Account 50-0208.

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Cases

Real Party in Interest

The real party in interest, and assignee of this case, is Siemens Product Lifecycle Management Software Inc.

Related Appeals or Interferences

To the best knowledge and belief of the undersigned attorney, there are none.

Status of Claims

Claims 1-3, 5, 14 and 15 were rejected are under final rejection, and are each appealed.

Dependent claims 4, 6-13, 16 and 17 were objected to for their multiple dependency, and have not been considered on the merits. The objections are not addressed in this brief. Should the rejections of the other claims be reversed, Appellant will accept allowance of the now-rejected claims and withdrawal/cancellation of the objected-to claims, or would be pleased to work with the Examiner to put them in a form acceptable to the Examiner.

Status of Amendments after Final

Various claims were amended after final rejection to address the claim objections or minor artifacts from the original European-style claims. These amendments were not entered, and so are not reflect in the Claims Appendix.

Summary of Claimed Subject Matter

The following summary refers to disclosed embodiments and their advantages, but does not delimit any of the claimed inventions.

In General

The present application is directed, in general, to computer-based processing of objects that have different shapes and different geometrical features, and more particularly, to the field of determining and using feature data that represents information about the shape of an object. *Page 1, lines 3-8.*

Support for Independent Claims

Note that, per 37 CFR §41.37, only each of the independent claims are discussed in this section, as well as any claims including means-plus-function language that is argued separately below. In the arguments below, however, the dependent claims are also discussed and distinguished from the prior art. The discussion of the claims is for illustrative purposes, and is not intended to effect the scope of the claims.

Independent claim 1 describes a method for determining feature data that represents information about the shape of an object, the object being located in a k-dimensional space (*e.g., as described on Specification page 7, lines 1-2*). The method includes determining, by a computer, a partitioning scheme that defines a plurality of cells in the space in which the object is located such that at least some of the cells each contain a respective portion of the object (*e.g., as described on Specification page 7, lines 28-30*). The method includes determining, by the computer, the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells (*e.g., as described on Specification page 8, lines 16-18*), wherein at least two of the plurality of cells overlap each other at least in part (*e.g., as described on Specification page 10, lines 10-20, and illustrated as in Fig. 5*).

Independent claim 5 describes a method for determining feature data that represents information about the shape of an object, the object being located in a k-dimensional space (*e.g., as described on Specification page 7, lines 1-2*). The method includes determining a partitioning scheme that defines a plurality of cells in the space in which the object is located such that at least some of the cells each contain a

respective portion of the object (*e.g., as described on Specification page 7, lines 28-30).* The method includes determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells (*e.g., as described on Specification page 8, lines 16-18)*, wherein the partitioning scheme is determined such that at least some of the boundaries of the cells defined by the partitioning scheme are adapted to the individual shape of the object to delimit a plurality of regions in the space in which the object is located such that the respective portions of the object that are contained in the plurality of regions are approximately equal to each other with respect to a predetermined measurement metric (*e.g., as described on Specification page 4, lines 22-28 and page 9, lines 5-13 and illustrated in Fig. 3).*

Grounds of Rejection to be Reviewed on Appeal

1. Are Claims 1, 2, 14 and 15 unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598, in view of U.S. Patent No. 6,091,842 to Domanik *et al.*?
2. Is Claim 3 unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598, in view of U.S. Patent No. 6,091,842 to Domanik *et al.* and further in view of U.S. Patent Publication No 2003/0036842 to Hancock?
3. Is Claim 5 unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598, in view of U.S. Patent Publication No 2005/0175235 to Luo, *et al.*?

ARGUMENT

Stated Grounds of Rejection

The rejections outstanding against the Claims are as follows:

1. In the November 18, 2010 Office Action, Claims 1, 2, 14 and 15 were rejected as unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598, in view of U.S. Patent No. 6,091,842 to Domanik *et al.*

2. In the November 18, 2010 Office Action, Claim 3 was rejected as unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598, in view of U.S. Patent No. 6,091,842 to Domanik *et al.* and further in view of U.S. Patent Publication No 2003/0036842 to Hancock.

3. In the November 18, 2010 Office Action, Claim 5 was rejected as unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using

Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598, in view of U.S. Patent Publication No 2005/0175235 to Luo, *et al.*

Legal Standards

In rejecting claims under 35 U.S.C. § 103(a), the examiner bears the initial burden of establishing a *prima facie* case of obviousness. (*In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). See also *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984)). It is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. (*Id.* at 1073, 5 USPQ2d at 1598). In so doing, the examiner is expected to make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), *viz.*, (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the art. In addition to these factual determinations, the examiner must also provide "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." (*In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir 2006) (cited with approval in *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007)).

Analysis of Examiner's Rejection

All rejections are flawed for showing significant limitations of the independent claims as taught or suggested by any art of record, relies on non-analogous-art references, and relies on a reference that is not shown to be prior art at all.

First Ground of Rejection

Claims 1, 2, 14 and 15 were rejected as unpatentable under 35 U.S.C. § 103(a) over Kriegel *et al.*, "Using Sets of Feature Vectors for Similarity Search on Voxelized CAD Objects" SIGMOD 2003, June 9-12 (ACM), pages 587-598 (hereinafter "Kriegel"), in view of U.S. Patent No. 6,091,842 to Domanik *et al.* (hereinafter "Domanik").

Claim 1

Claim 1 requires:

> 1. A method for determining feature data that represents information about the shape of an object *(o)*, the object *(o)* being located in a *k*-dimensional space, the method comprising the steps of:
>
> determining, by a computer, a partitioning scheme that defines a plurality of cells in the space in which the object is located such that at least some of the cells each contain a respective portion of the object, and
>
> determining, by the computer, the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells, wherein at least two of the plurality of cells overlap each other at least in part.

The proposed combination does not teach the significant limitations of the claims as alleged by the final Office Action.

For example, claim 1 requires determining the feature data for the object *on the basis of at least one property of the respective portions of the object* that are contained in the plurality of cells. Nothing in Kriegel or in the proposed combination discusses doing anything on the basis of a "property of the respective portions of the object" as

claimed.

Since the Office Action does not actually show this limitation as taught in the art, but merely references an entire section of Kriegel, there is no *prima facie* rejection with regard to this element.

The final Office Action responds that

> At least at the abstract of Kriegel, Kriegel teaches "we explain how sets of feature vectors can be used for more effective and still efficient similarity search[es]." From this description, the ordinary skilled artisan would understand that the objects for consideration of image analysis with respect to "molecular biology and medical imaging" each of which could process similarities queries (searches) on a cell or plurality of cells, that the determination of feature data would be derived from a plurality of cells.
>
> The ordinary skilled artisan could have also easily analyzed and looked to the Kriegel reference to teach feature data that was based on the properties of portions of an object.
>
> Notwithstanding, Kriegel at page 587, Section 1, right column, paragraph one, also teaches, "this invention is based on mapping an object onto a set of feature vectors, i.e. an object is described in a point set." *Office Action, page 3.*

For the convenience of the Board, the portions of Kriegel referenced by the Examiner teach:

> In modern application domains such as multimedia,

molecular biology and medical imaging, similarity search in database systems is becoming an increasingly important task. Especially for CAD applications, suitable similarity models can help to reduce the cost of developing and producing new parts by maximizing the reuse of existing parts. Most of the existing similarity models are based on feature vectors. In this paper, we shortly review three models which pursue this paradigm. Based on the most promising of these three models, we explain how sets of feature vectors can be used for more effective and still efficient similarity search. We first introduce an intuitive distance measure on sets of feature vectors together with an algorithm for its efficient computation. Furthermore, we present a method for accelerating the processing of similarity queries on vector set data. The experimental evaluation is based on two real world test data sets and points out that our new similarity approach yields more meaningful results in comparatively short time. *Kriegel, Abstract.*

Especially, the development, design, manufacturing and maintenance of modern engineering products is a very expensive and complex task. Effective similarity models are required for two- and three-dimensional CAD applications to cope with rapidly growing amounts of data. Shorter product cycles and a greater diversity of models are becoming decisive competitive factors in the hard-fought automobile and aircraft market. These demands can only be met if the engineers have an overview of already existing CAD parts. In this paper, we introduce an effective and flexible similarity model for complex 3-D CAD data, which helps to find and group similar parts. This model is particularly suitable for voxelized data, which often occur in CAD applications. It is not based on the traditional approach of describing one object by a single feature vector

> but instead we map an object onto a *set of feature vectors*, i.e. an object is described by a *point set. Kriegel, page 587, emphasis in original.*

Close review of the portions relied upon by the Office Action make it clear that nothing whatsoever teaches, suggests, or implies determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells, as claimed. It simply isn't in there. The statement in the Office Action appears to be that "feature vectors" can be used for "searches", which is supported in Kriegel, but the Office Action then states without basis that "the determination of feature data would be derived from a plurality of cells" – which simply isn't supported in the references.

The final Office Action also makes reference to an "AutoCAD 2011 Help Dictionary", but does not supply a copy of this reference, and it is not of record. However, Appellant respectfully notes that, based on the title cited by the Examiner, this reference appears to post-date the instant application by several years, and so is neither prior art nor relevant to any argument as to what one of skill in the art would have understood in 2006 (the filing date of this application) or 2005 (the filing date of the priority application). Appellant suggests that the Board must disregard any

reference to or argument involving this reference.

Further, the final Office Action makes reference to something called "JavaScript Mapping Library," and supplies what appears to be a printout from openlayers.org dated November 10, 2010. This also is neither prior art nor relevant to any argument as to what one of skill in the art would have understood in 2006 (the filing date of this application) or 2005 (the filing date of the priority application). Appellant suggests that the Board must disregard any reference to or argument involving this reference.

The limitation of determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells is not taught by the references. The Examiner has not met her burden to show this feature in the references, and the rejection will be reversed on appeal.

The Kriegel also clearly does not teach or consider any case where at least two of the plurality of cells overlap each other at least in part, as in claim 1. The Office Action does not allege any such teaching.

Instead, the Office Action refers to Domanik. Domanik is drawn to a "cytological specimen analysis system with slide mapping and generation of viewing path information" – the study of microscope-type slide images having biological cell

material. This has nothing at all to do with the techniques disclosed by Kriegel with regard to using sets of feature vectors for similarity search on voxelized CAD objects. Domanik does not discuss voxels, and has no application to CAD systems or objects. These are disparate, non-analogous references.

Domanik basically teaches that a slide image can be divided into region "tiles", and that the depicted cell (which naturally covers most of the slide) would cover multiple tiles. This has nothing at all do to with the current claims or the Kriegel's system. Of course, the CAD "cells" described in Kriegel's system are completely unrelated to the biological cell shown in Domanik's slide image.

These references cannot be properly combined. No person of skill in the art in CAD systems, searching for a way to find similarity of CAD objects using feature vectors, would look to a system that determines if regions of a slide image contain biological cell material. No person would have any expectation of success in combining biological slide "tiles" into a CAD system – and it does not appear that any combination of these references would actually function.

The Examiner's stated "motivation" to combine Domanik's cytological slide system with Kriegel's CAD system is for improvements in screening and analyzing

cytological specimens as taught in Domanik. Since there is no application in Domanik for analyzing voxels, feature objects, or feature vectors, this "motivation" is clearly incorrect. Domanik has no application in retrieval of similar 3D objects, as described by Kriegel, at all.

All rejections must therefore be reversed for improperly relying on unrelated and non-combinable teachings in Domanik.

The final Office Action responds that

> Kriegel and Domanik are combinable because they are in the same field of image processing with respect to image processing applications in relation to biomedical applications and more specifically, cell analysis, classification and counting.
>
> In response to applicant's argument that Domanik is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Domanik teaches image processing biomedical analysis on cells, cytological specimen as shown at the abstract and title of the invention. *Office Action, pages 4-5.*

This is incorrect. First, the statement that Kriegel is in the field of "image processing" is a mischaracterization. Kriegel is concerned with voxelized CAD objects. Kriegel references "previous approaches" that concerned digital images (*see page 587, last paragraph)* and states that "paradigm" of feature-based similarity has been applied to "color histograms in image databases" (*see page 588, second paragraph under 2.1*). Kriegel indicates that the authors "plan to examine various other applications for similarity search, such as the retrieval of biomolecular data and images" (*see page 597, last paragraph on first column*). Kriegel itself is not in the field of image processing.

It is also a mischaracterization to state that Kriegel is in the field of "cell analysis, classification and counting". Kriegel uses the term "cell" to reference spatial divisions, and does not "analyze" a spatial cell itself. Kriegel gives its examples as cars and aircraft. Domanik, on the other hand, is related to actual, biological cells. These are completely different.

While Kriegel clearly has some relevance to the instant application, and is in fact discussed in paragraph 0004 of the present application, Domanik has no relevance whatsoever. Kriegel's system does not teach or suggest anything related to

overlapping cells, overlapping groups of cells, or nested cells, and cannot function as claimed, and Domanik provides no relevant teaching other than using a common "cell" term, albeit with a completely different meaning.

The various "suggestions/motivations" provided by the Examiner are also flawed. For example, while Domanik's technique for finding a path may reduce the time needed to examine a biological cell, this bears no relation at all to any of Kriegel's teachings, and provides no advantage at all in Kriegel's system.

For failing to show the limitations of this claim in the reference, and for relying on non-analogous art, this rejection must be reversed.

Claim 2

This is a dependent claim, and so the arguments above with regard to the parent claim apply here as well, and are incorporated by reference.

This claim requires that the plurality of cells comprises at least a first and a second group of cells such that the union of the cells in the first group of cells coincides with the union of the cells in the second group of cells, wherein each cell of the first group of cells overlaps at least in part with at least one respective cell of the

second group of cells. This is not taught or suggested by any combination of the cited references.

The Office Action alleges that this is taught by Domanik, stating "Refer to Figure 1, numeral 102; "Image capture of a specimen 103 on the slide 102 is performed by subdividing the slide 102 into a plurality of equally sized regions, designated by the dotted lines in the slide 102, and individually capturing a digital image of a region."

As described above, Domanik is non-analogous art and should not be relied upon for any purpose at all. In addition, it does not teach or suggest this claimed feature. For the convenience of the Board, these portions teach:

FIG. 1

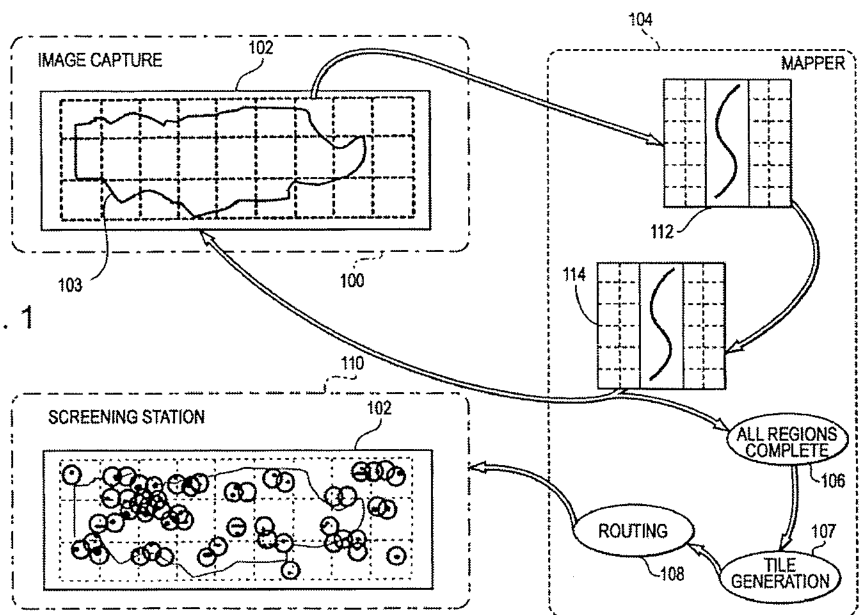

FIG. 1 of the drawings shows by way of example, the functions

> performed by a cytological screening system employing the principles of the present invention. The cytological screening system of FIG. 1, which is adapted for use in a clinical laboratory or like facility, preferably includes image capture apparatus 100, a mapper 104 and a screening station 110 which includes a microscope for viewing of cytological specimens. The image capture apparatus 100 employs a camera to capture digital images of a slide 102. Image capture of a specimen 103 on the slide 102 is performed by subdividing the slide 102 into a plurality of equally sized regions, designated by the dotted lines in the slide 102, and individually capturing a digital image of a region. The digital image of the region is stored in a memory once captured and is analyzed by mapper 104 which operates to analyze the region for the presence of cytological material. If any cytological material is detected, the region is designated by the mapper as a screenable region. Once the region is analyzed, a digital image of another region of the slide is captured at 100 and analyzed at 104. This sequence is repeated until each region of slide 102 has been captured and analyzed. *Domanik, col. 3, lines 2-23*.

The Office Action appears to recognize that there is no such teaching, adding "Note: As shown at Figure 1, the Examiner is points to numeral 106 to teach that the cells have been divided into groups of cells as shown at numeral 102. It is also shown

at least at numeral 102 that the groups of cells overlap." *Office Action, page 11, emphasis in original.* Even this "note" does not create a relevant teaching in Domanik

Even the most cursory examination of Domanik, and this figure and passage in particular, reveals that there is no teaching at all of any "first group of cells" and "second group of cells", as claimed, such that the union of the first group of cells coincides with the union of the second group of cells. There is no teaching at all of any "first group of cells" and "second group of cells", as claimed, where <u>each cell of the first group</u> of cells overlaps at least in part with <u>at least one respective cell of the second group</u> of cells. Domanik simply has no such teaching or illustration.

The rejection of this claim should be reversed.

<u>Claim 14</u>

This is a dependent claim, and so the arguments above with regard to the parent claim apply here as well, and are incorporated by reference.

This claim requires that the determining steps are performed first for a first object and then also performed for a set of second objects to determine feature data for the first object and for each of the set of second objects, and further comprising

performing a similarity search between the first object and the set of second objects based on a comparison of the determined feature data. This is not taught or suggested by any combination of the cited references.

The Office Action simply refers to Kriegel's Abstract, quoting "The experimental evaluation is based on two real world test data sets and points out that our new similarity approach yields more meaningful results in comparatively short time."

Nothing in this sentence, the remainder of Kriegel's Abstract, or any combination of the references in their entireties is shown to teach performing the determination first for a first object and then for a set of second objects to determine feature data for the first object and for each of the set of second objects, or performing a similarity search between the first object and the set of second objects based on a comparison of the determined feature data, as claimed.

The rejection of this claim should be reversed.

Claim 15

This is a dependent claim, and so the arguments above with regard to the parent claim apply here as well, and are incorporated by reference.

This claim requires the determining steps are performed to determine feature data for each object of a set of objects, and wherein the objects of the set of objects are grouped according to their respective similarities on the basis of a classification of the determined feature data.

The Office Action simply refers to a sentence of Kriegel's Introduction, quoting "In this paper, we introduce an effective and flexible similarity model for complex 3-D CAD data, which helps to find and group similar parts."

Nothing in this sentence, the remainder of Kriegel's Introduction, or any combination of the references in their entireties is shown to teach that the determining steps are performed to determine feature data for each object of a set of objects, and wherein the objects of the set of objects are grouped according to their respective similarities on the basis of a classification of the determined feature data, as claimed.

The rejection of this claim should be reversed.

Second Ground of Rejection

Claim 3 was rejected as unpatentable under 35 U.S.C. § 103(a) over Kriegel in view of Domanik and further in view of U.S. Patent Publication No 2003/0036842 to Hancock (hereinafter "Hancock").

This is a dependent claim, and so the arguments above with regard to the parent claim apply here as well, and are incorporated by reference.

This claim requires that the plurality of cells comprises at least a group of nested cells, wherein all cells of the group of nested cells are nested within each other.

The Office Action acknowledges that Kriegel and Domanik do not teach this limitation, and states "Hancock expressly teachE~s at least a group of nested cells wherein all cells of the group of nested cells are nested within each other ("At least some of the plurality of cells of the one or more local city grids directly overlap and coincide with at least some of the plurality of cells of the one or more regional grids to form a nested grid structure." at abstract, paragraphs [0007, 0008])." These portions teach:

> A nested grid structure of a geographical referencing system includes one or more regional grids generally centered on one or more respective grid origins, each regional grid including a

plurality of cells. One or more local cities are located at least partially within the one or more regional grids. One or more local city grids, each including a plurality of cells, are generally centered on one or more respective local city origins of the one or more local cities. At least some of the plurality of cells of the one or more local city grids directly overlap and coincide with at least some of the plurality of cells of the one or more regional grids to form a nested grid structure. *Hancock, Abstract.*

[0007] Another aspect of the invention involves a nested grid structure of a geographical referencing system. The nested grid structure includes one or more regional grids generally centered on one or more respective grid origins, each regional grid including a plurality of cells. One or more local cities are located at least partially within the one or more regional grids. One or more local city grids, each including a plurality of cells, are generally centered on one or more respective local city origins of the one or more local cities. At least some of the plurality of cells of the one or more local city grids directly overlap and coincide with at least some of the plurality of cells of the one or more regional grids to form a nested grid structure.

[0008] An additional aspect of the invention involves a method of creating a nested grid structure for a geographical referencing

> system. The method includes determining a regional origin for a regional; centering a regional grid for the region generally on the regional origin, the regional grid including a plurality of cells; determining a local city origin for a local city located at least partially within the regional grid; and positioning a local city grid including a plurality of cells so that the local city grid is generally centered on the local city origin and at least some of the plurality of cells of the local city grid directly overlap and coincide with at least some of the plurality of cells of the regional grid to form a nested grid structure. *Hancock, paragraphs 0007-0008.*

Hancock generally discusses nested "cells' on a "regional grid" geographic map. Hancock is drawn to a geographic nesting system, and is completely non-analogous art to either Kriegel's "Similarity Search on Voxelized CAD Objects" or Domanik's "Cytological specimen analysis system". Hancock cannot be seen to cure the deficiencies of the Kreigel/Domanik combination. No combination of the references teach the limitations of the claims. It appears these disparate references were simply cited because they reference grids, with no concern for whether they are actually related at all to the CAD processes as claimed.

The rejection of this claim should be reversed.

Third Ground of Rejection

Claim 5 was rejected as unpatentable under 35 U.S.C. § 103(a) over Kriegel in view of U.S. Patent Publication No 2005/0175235 to Luo, *et al.* (hereinafter "Luo").

Arguments above with regard to similar limitations of Claim 1 are incorporated by reference.

Claim 5 requires:

> 5. A method for determining feature data that represents information about the shape of an object, the object being located in a k-dimensional space, the method comprising the steps of:
>
> determining a partitioning scheme that defines a plurality of cells in the space in which the object is located such that at least some of the cells each contain a respective portion of the object, and
>
> determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells, wherein the partitioning scheme is determined such that at least some of the boundaries of the cells defined by the partitioning scheme are adapted to the individual shape of the object to delimit a plurality of regions in the space in which the object (o) is located such that the respective portions of the object that are contained in the plurality of regions are

approximately equal to each other with respect to a predetermined measurement metric.

For example, this claim requires determining the feature data for the object *on the basis of at least one property of the respective portions of the object* that are contained in the plurality of cells. Nothing in Kriegel or in the proposed combination discusses doing anything on the basis of a "property of the respective portions of the object" as claimed.

Since the Office Action does not actually show this limitation as taught in the art, but merely references an entire section of Kriegel, there is no *prima facie* rejection with regard to this element.

The final Office Action responds that

> At least at the abstract of Kriegel, Kriegel teaches "we explain how sets of feature vectors can be used for more effective and still efficient similarity search[es]." From this description, the ordinary skilled artisan would understand that the objects for consideration of image analysis with respect to "molecular biology and medical imaging" each of which could process similarities queries (searches) on a cell or plurality of cells, that the determination of feature data would be derived from a plurality of cells.
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> The ordinary skilled artisan could have also easily analyzed and looked to the Kriegel reference to teach feature data that

> was based on the properties of portions of an object.
>
> Notwithstanding, Kriegel at page 587, Section 1, right column, paragraph one, also teaches, "this invention is based on mapping an object onto a set of feature vectors, i.e. an object is described in a point set." *Office Action, page 3.*

For the convenience of the Board, the portions of Kriegel referenced by the Examiner were reproduced above with respect to Claim 1. As indicated above, a review of the portions relied upon by the Office Action make it clear that nothing whatsoever teaches, suggests, or implies determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells, as claimed. It simply isn't in there. The statement in the Office Action appears to be that "feature vectors" can be used for "searches", which is supported in Kriegel, but the Office Action then states without basis that "the determination of feature data would be derived from a plurality of cells" – which simply isn't supported in the references.

The final Office Action also makes reference to an "AutoCAD 2011 Help Dictionary", but does not supply a copy of this reference, and it is not of record. However, Appellant respectfully notes that, based on the title cited by the Examiner,

this reference appears to post-date the instant application by several years, and so is neither prior art nor relevant to any argument as to what one of skill in the art would have understood in 2006 (the filing date of this application) or 2005 (the filing date of the priority application). Appellant suggests that the Board must disregard any reference to or argument involving this reference.

Further, the final Office Action makes reference to something called "JavaScript Mapping Library," and supplies what appears to be a printout from openlayers.org dated November 10, 2010. This also is neither prior art nor relevant to any argument as to what one of skill in the art would have understood in 2006 (the filing date of this application) or 2005 (the filing date of the priority application). Appellant suggests that the Board must disregard any reference to or argument involving this reference.

The limitation of determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells is not taught by the references. The Examiner has not met her burden to show this feature in the references, and the rejection will be reversed on appeal.

Kriegel also clearly does not teach or consider any case where the partitioning scheme is determined such that at least some of the boundaries of the cells defined by

the partitioning scheme are adapted to the individual shape of the object to delimit a plurality of regions in the space in which the object is located such that the respective portions of the object that are contained in the plurality of regions are approximately equal to each other with respect to a predetermined measurement metric, as claimed.

The Examiner instead relies on Luo. Luo is directed to a system for pattern recognition for use in automobile occupant restrain systems. It is also non-analogous art, and does not cure the deficiencies of Kriegel or the Kreigel/Domanik combination.

The Office Action alleges that Luo teaches this limitation at paragraphs 0031 and 0033. For the convenience of the Board, these paragraphs teach:

> [0031] In an exemplary embodiment, the initial grid pattern is applied to divide the composite image into sub-images of the same general size and shape. For example, it the original image is a two-dimensional square, the initial grid pattern can be divided into 2^{2N} squares of equal size by (4N-2) intersecting lines, where N is a positive integer. Similarly, a two-dimensional circular region can be divided into a plurality of equal size wedge-shapes regions via one or more evenly spaced lines drawn through a center point of the circular region. One skilled in the art will appreciate additional methods of determining an initial grid for various applications

from the description herein.

. . .

[0033] At step 408, the grid pattern is modified to divide the selected one or more sub-images into respective pluralities of sub-images. A selected sub-image can be divided by adding one or more line segments to the grid pattern to separate the sub-image into two or more new sub-images. In an exemplary embodiment, the selected sub-images are divided as to produce sub-images of the same general shape. For example, if the initial grid pattern separates the image into square sub-images, the grid pattern can be modified such that a selected sub-image is separated into a plurality of smaller squares. *Luo, paragraphs 0031, 0033.*

Luo's Fig 5D shows a subdivision:

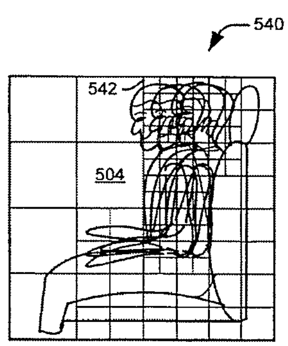

FIG. 5D

Nothing here can be reasonably read to teach or suggest that some of the boundaries of the cells are defined by the partitioning scheme are adapted to the

individual shape of the object to delimit a plurality of regions in the space in which the object is located such that the respective portions of the object that are contained in the plurality of regions are approximately equal to each other with respect to a predetermined measurement metric, as claimed.

The characterizations of the references found in the Office Action are not supported in the reference, and baseless characterizations of the references cannot be a proper basis for a rejection.

No combination of the references teach the limitations of the claims. It appears these disparate references were simply cited because they reference grids, with no concern for whether they are actually related at all to the CAD processes as claimed.

For failing to show the limitations of this claim in the reference, and for relying on non-analogous art, this rejection must be reversed.

All rejections should be reversed.

Grouping of Claims

The claims on appeal do not stand or fall together, as may be seen from the arguments set forth above. Each claim or group of claims that has been argued separately under a separate subheading should be considered separately. While the Appellant recognizes that a formal statement regarding the grouping of claims is no longer required, each claim should be considered separately; or at the very least each claim which is argued separately in the preceding sections of this brief should be considered separately.

REQUESTED RELIEF

The Board is respectfully requested to reverse the outstanding rejections and return this application to the Examiner for allowance.

Respectfully submitted,

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Date: 4/4/11

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ATTORNEY FOR APPELLANT

APPENDIX A -

Claims Appendix

1. (Previously Presented) A method for determining feature data that represents information about the shape of an object *(o)*, the object *(o)* being located in a *k*-dimensional space, the method comprising the steps of:

determining, by a computer, a partitioning scheme that defines a plurality of cells in the space in which the object is located such that at least some of the cells each contain a respective portion of the object, and

determining, by the computer, the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells, wherein at least two of the plurality of cells overlap each other at least in part.

2. (Previously Presented) The method of claim 1, characterized in that the plurality of cells comprises at least a first and a second group of cells such that the union of the cells in the first group of cells coincides with the union of the cells in the second group of cells, wherein each cell of the first group of cells overlaps at least in part with at least one respective cell of the second group of cells.

3. (Previously Presented) The method of claim 1 or claim 2, characterized in that the plurality of cells comprises at least a group of nested cells, wherein all cells of the group of nested cells are nested within each other.

4. (Previously Presented) The method of claim 3, characterized in that the cells of the group of nested cells form a sequence in which the *k*-dimensional volume of the respective portions of the object *(o)* that are contained in the cells of the group of nested cells increases in a substantially regular manner.

5. (Previously Presented) A method for determining feature data that represents information about the shape of an object, the object being located in a *k*-dimensional space, the method comprising the steps of:

determining a partitioning scheme that defines a plurality of cells in the space in which the object is located such that at least some of the cells each contain a respective portion of the object, and

determining the feature data for the object on the basis of at least one property of the respective portions of the object that are contained in the plurality of cells, wherein the partitioning scheme is determined such that at least some of the boundaries of the cells defined by the partitioning scheme are adapted to the individual shape of the object to delimit a plurality of regions in the space in which the object *(o)* is located such that the respective portions of the object that are contained in the plurality of regions are approximately equal to each other with respect to a predetermined measurement metric.

6. (Previously Presented) The method of claim 5 or any of claims 1 – 4.

7. (Previously Presented) The method of claim 5 or claim 6, characterized in that at least one region of the plurality of regions contains at least two cells of the plurality of cells that overlap each other at least in part.

8. (Previously Presented) The method of one of claims 5 - 7, characterized in that all regions of the plurality of regions are disjoint with respect to each other.

9. (Previously Presented) The method of one of claims 5 - 8, characterized in that the measurement metric, for each region of the plurality of regions, is the k-dimensional volume of the respective portion of the object contained in this region.

10. (Previously Presented) The method of one of claims 5 - 9, characterized in that each region of the plurality of regions corresponds to the union and/or difference and/or intersection of at least two cells of the plurality of cells or to exactly one cell of the plurality of cells.

11. (Previously Presented) The method of one of claims 5 - 10, characterized in that at least some of the regions of the plurality of regions represent k-dimensional spheres and/or k-dimensional shells and/or sectors of k-dimensional spheres and/or sectors of k-dimensional shells in the space in which the object is located.

12. (Previously Presented) The method of one of claims 1 - 11, characterized in that at least some of the cells defined by the partitioning scheme represent k-dimensional spheres and/or k-dimensional shells and/or sectors of k-dimensional spheres and/or sectors of k-dimensional shells in the space in which the object is located.

13. (Previously Presented) The method of one of claims 1 - 12, characterized in that the feature data for the object is determined on the basis of the k-dimensional volume of each respective portion of the object contained in each cell of the plurality of cells and/or on the basis of data defining the k principal axes of each respective portion of the object contained in each cell of the plurality of cells.

14. (Previously Presented) The method of claim 1, wherein the determining steps are performed first for a first object and then also performed for a set of second objects to determine feature data for the first object and for each of the set of second objects, and further comprising performing a similarity search between the first object and the set of second objects based on a comparison of the determined feature data.

15. (Previously Presented) The method claim 1, wherein the determining steps are performed to determine feature data for each object of a set of objects, and wherein the objects of the set of objects are grouped according to their respective similarities on the basis of a classification of the determined feature data.

16. (Previously Presented) A non-transitory computer-readable medium encoded with executable program instructions for execution by at least one processor, wherein the program instructions cause the at least one processor to perform a method according to one of claims 1 - 15.

17. (Previously Presented) Apparatus comprising at least one processor, wherein the apparatus is configured to perform a method according to one of claims 1 - 15.

APPENDIX B -
Copy of Formal Drawings

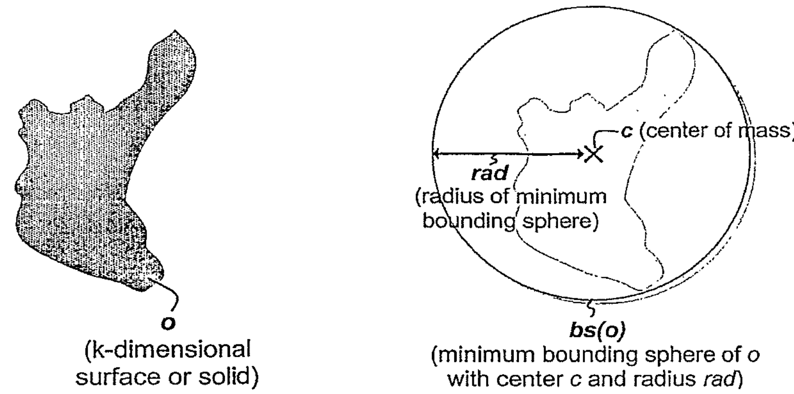


Fig. 1

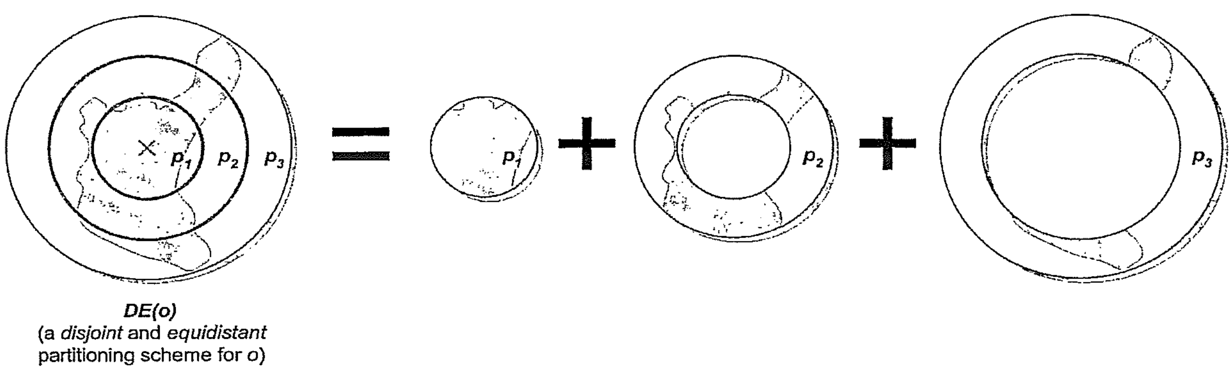


Fig. 2 (Prior Art)

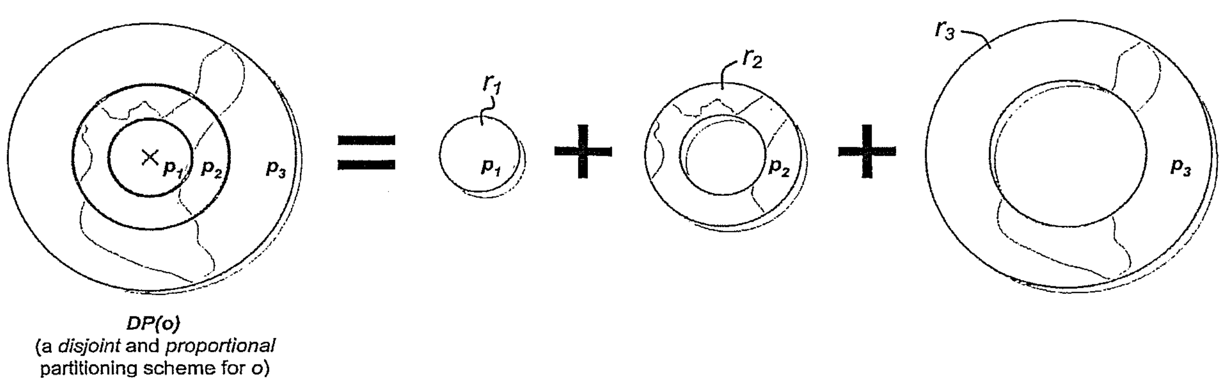


Fig. 3

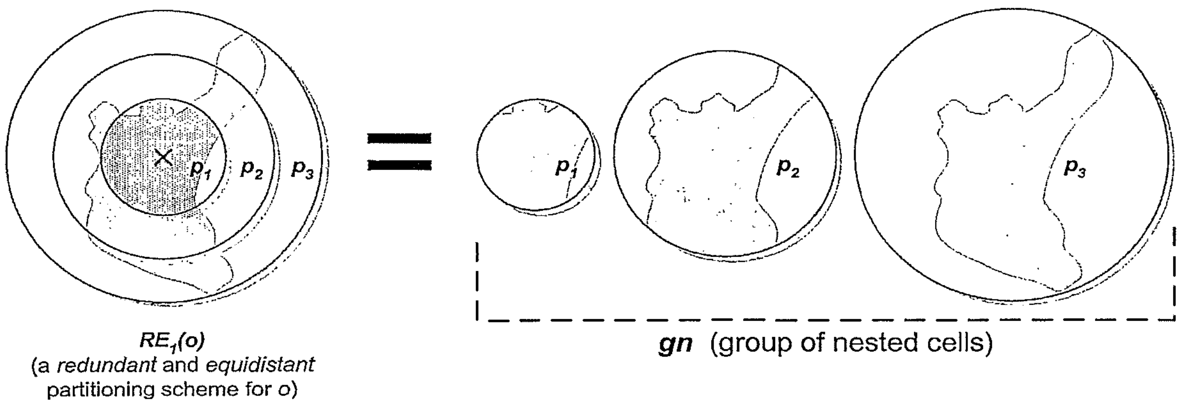

p1
p2
p3
=
RE1(o)
(a redundant and equidistant partitioning scheme for o)
gn (group of nested cells)

Fig. 4

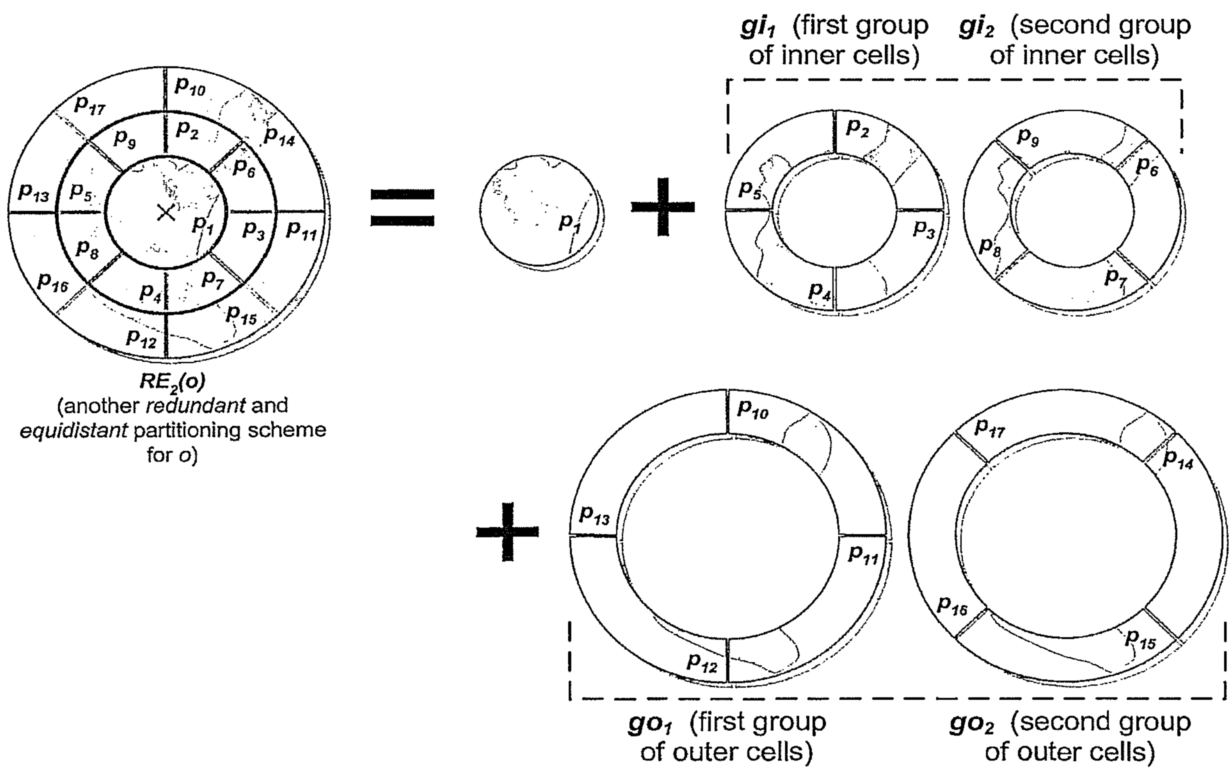
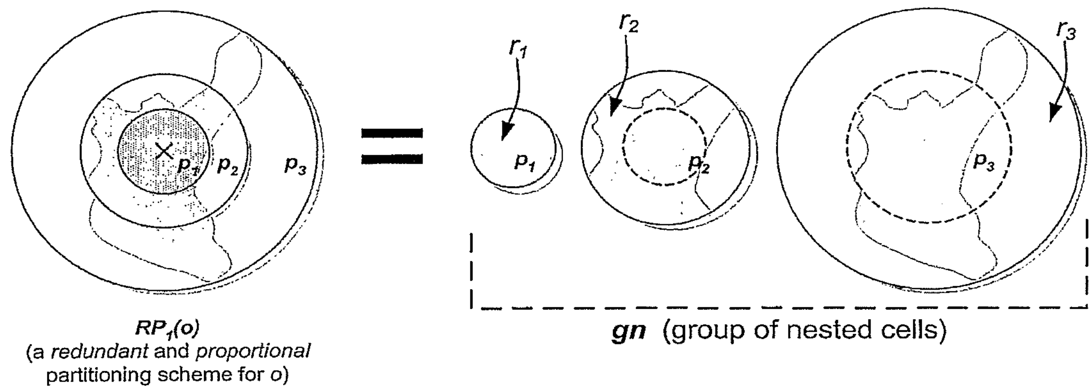
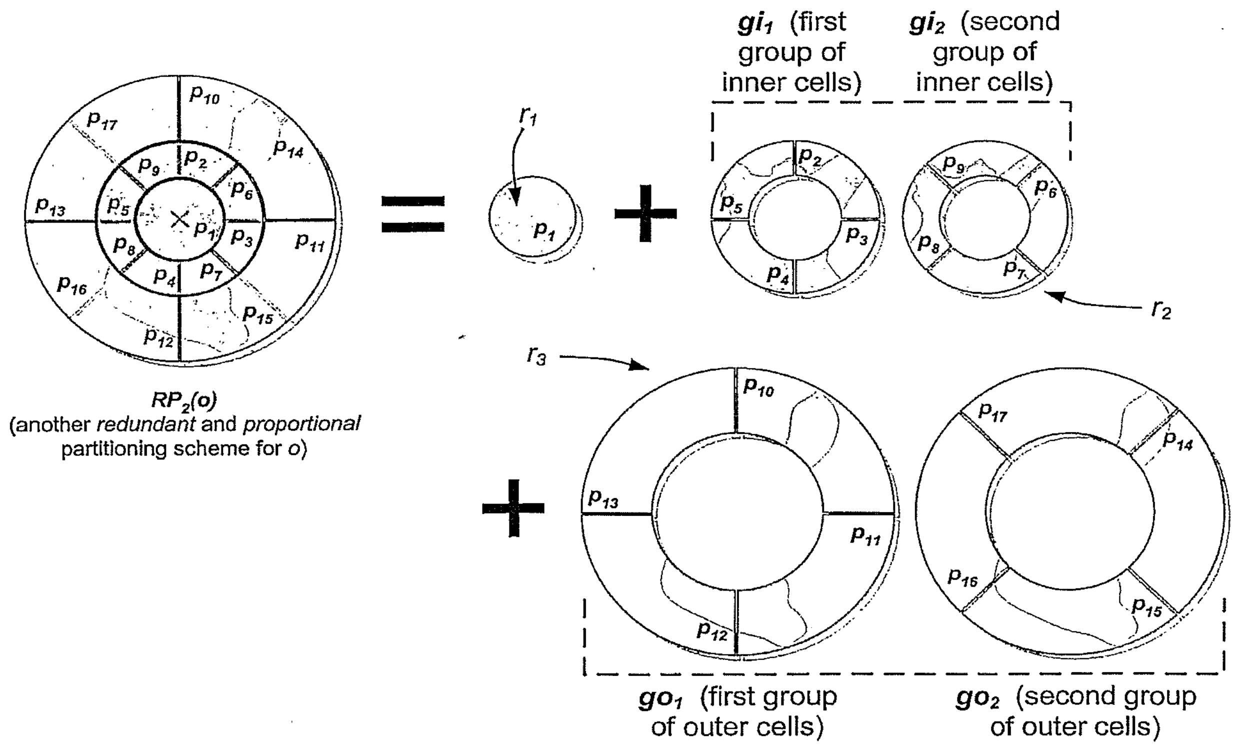

p1
p2
p3
p4
p5
p6
p7
p8
p9
p10
p11
p12
p13
p14
p15
p16
p17
RE2(o)
(another redundant and equidistant partitioning scheme for o)
=
+
gi1 (first group of inner cells)
gi2 (second group of inner cells)
+
go1 (first group of outer cells)
go2 (second group of outer cells)

Fig. 5



p_1
p_2
p_3
=
r_1
r_2
r_3
p_1
p_2
p_3
RP1(o)
(a redundant and proportional partitioning scheme for o)
gn (group of nested cells)

Fig. 6



p_1 p_2 p_3 p_4 p_5 p_6 p_7 p_8 p_9 p_{10} p_{11} p_{12} p_{13} p_{14} p_{15} p_{16} p_{17}
RP2(o)
(another redundant and proportional partitioning scheme for o)
=
r_1
+
gi1 (first group of inner cells)
gi2 (second group of inner cells)
r_2
r_3
+
go1 (first group of outer cells)
go2 (second group of outer cells)

Fig. 7

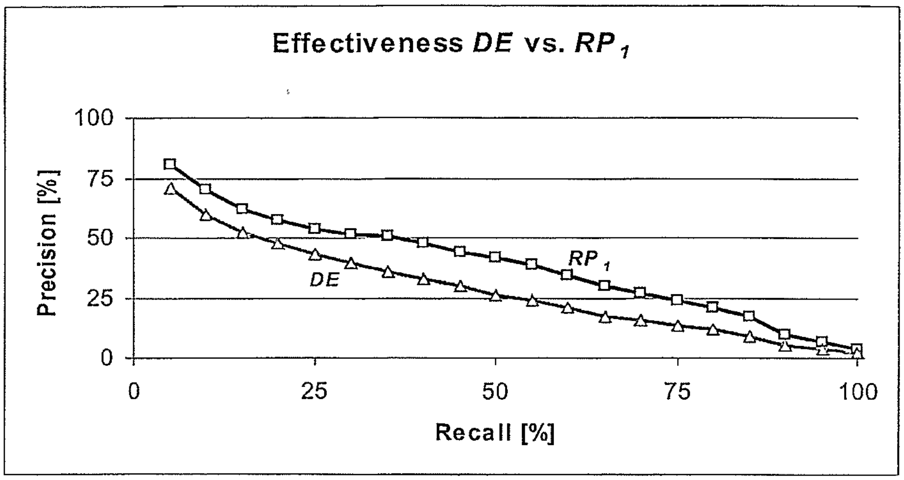

Effectiveness DE vs. RP1
100
75
50
25
0
Precision [%]
RP1
DE
0
25
50
75
100
Recall [%]

Fig. 8

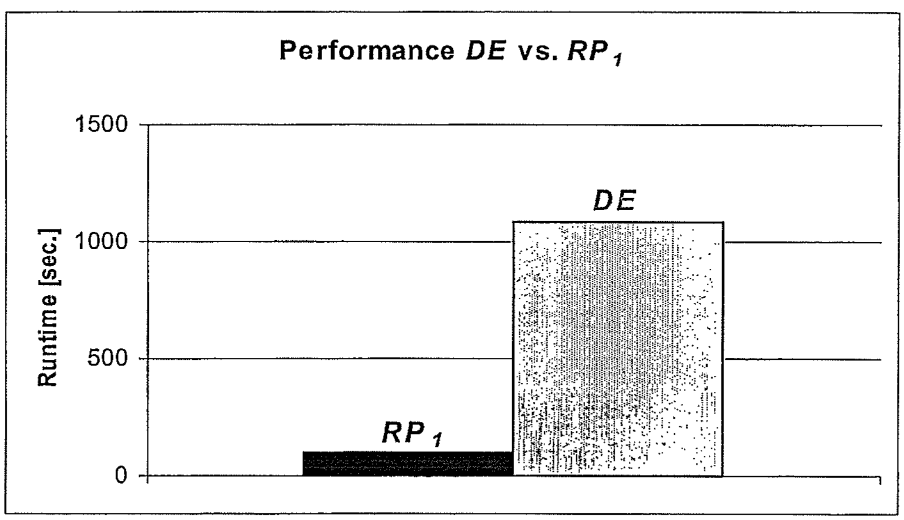

Performance DE vs. RP1
1500
1000
500
0
Runtime [sec.]
DE
RP1

Fig. 9

APPENDIX C -
Evidence Appendix

Not Applicable -- No other evidence was entered.

APPENDIX D -
Related Proceedings Appendix

Not Applicable -- To the best knowledge and belief of the undersigned attorney, there are none.